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A Global Database of Domestic and International Tourist Numbers at National and Subnational Level

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ABSTRACT

We present a new, global database on tourist destinations. The database differs from other databases in that it includes both domestic and international tourists; and it contains, for the most important destinations, data at national level as well as at lower administrative levels. Missing observations are interpolated using statistical models. The data are freely accessible on the internet. Copyright © 2007 John Wiley & Sons, Ltd.

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Keywords: Tourism; data.

1. INTRODUCTION

Recreation and tourism is one of the largest economic activities of the world, some even say it is the largest. Yet, information on tourism is hard to get. Although there is a wealth of data, there are few comprehensive, internally consistent datasets. If one were to ask the question 'Where do tourists go?', the answer would be vague. The World Tourism Organisation (WTO) collects data at the national level (WTO, 2003) so that the answer would be that 'France is the most popular destination of international tourists'. France, however, is a big and diverse country; in Limousin, tourists are few and far between.[1] If one instead turns to survey data, say of German tourists, the most common type of international tourist, one would find reasonable geographical detail for the most popular destinations, but for less popular choices, countries are grouped: 5.8% of German tourists go to the Balearic Islands and 0.3% to Southern Africa (FUR, 1998). A further problem is that international tourism is only one part. Domestic tourism is important too. Most US tourists never leave their country, but their numbers are far bigger than the Germans'. This paper attempts to fill these gaps. It presents a new database that (i) combines domestic and international tourism; (ii) has destinations at national and subnational level; and (ii) interpolates missing observations.

Section 2 discusses the data, definitions, sources, problems and interpolation algorithms. Section 3 shows and interprets the results. Here, we present maps with complete data and tables with selections. The entire dataset can be downloaded at: http://www.fnu.zmaw.de/HTM.5681.0.html

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Section 4 concludes. Appendix 1 contains a list of all data sources.

2. THE DATA

2.1. Base year

We picked 1995 as our base year. Although 1995 is certainly a while ago, it was the year with the most comprehensive international coverage; countries were slow to report tourism numbers. For more recent years, data coverage is reduced or publishing data in the public domain would violate copyright. In Appendix 2, we show that geographic patterns of tourism change only slowly. Therefore, older data are still valid for understanding geographic patterns of tourism.

2.2. International arrivals and departures

The data on international arrivals and departures for 1995 are taken from the World Resources Databases (WRI, 2002).[2] There are two major problems with this dataset. First, for some countries, the reported data are arrivals and departures for tourism only. For other countries, the data are arrivals and departures for all purposes. Unfortunately, it is impossible to correct this.[3] Second, definitions of what is a tourist differ, although most countries count as a tourist someone who stays at least one night away from home and not longer than a year. Nonetheless, temporary workers often disguise themselves as tourists. Again, the data cannot be corrected for this. Note that day trippers are omitted from our database — as well as from other databases. Third, some countries count tourists at the border, other countries count tourists in all tourist accommodations (so that those visiting friends and family are largely left out), while other countries count at hotels only. Some countries count tourists, while other countries estimate numbers. Correcting the data for this is not possible. Fourth, there are missing observations, particularly with regard to departures. Missing observations can be interpolated.

For arrivals, 181 countries have data but 26 do not. We filled the missing observations with a statistical model, *viz.*

$$\begin{aligned}\ln A_i = {} & \underset{0.97}{5.97} + \underset{0.96}{2.05}\cdot 10^{-7} Area_i + \underset{0.07}{0.22} T_i \\ & - \underset{2.21}{7.91}\cdot 10^{-3} T_i^2 + \underset{3.03}{7.15}\cdot 10^{-5} Coast \\ & + \underset{0.09}{0.80} \ln Y_i \\ N = 1.39;\ & R^2_{adj} = 0.54\end{aligned} \tag{1}$$

where A denotes total arrivals, *Area* is land area (in square kilometre); T is annual average temperature for 1961–1990 (in degree Celsius) averaged over the country, *Coast* is length of coastline (in kilometres), and Y is per capita income; i indexes destination country. This model is the best fit[4] to the observations for the countries that we do have data.[5] The total number of tourists increases from 55.2 million (observed) to 56.5 million (observed + modelled). The 26 missing observations constitute only 2% of the international tourism market.

For departures, the data problem is more serious: 107 countries report but 99 do not[6]; 46.5 million departures are reported, against 56.5 million arrivals, so that 18% of all international tourists have an unknown origin. We filled the missing observations with a statistical model, *viz.*

$$\begin{aligned}\ln \frac{D_i}{Pop_i} = {} & \underset{17.05}{1.51} - \underset{0.17}{0.18} T_i + \underset{16.83}{4.83}\cdot 10^{-3} T_i^2 \\ & - \underset{4.22}{5.56}\cdot 10^{-2} Border + \underset{0.09}{0.86} \ln Y_i \\ & - \underset{0.13}{0.23} \ln Area_i \\ N = 99;\ & R^2_{adj} = 0.66\end{aligned} \tag{2}$$

where D denotes departures (in number), *Pop* denotes population (in thousands) and *Border* is the number of countries with shared land borders; i indexes the country of origin. This model is the best fit[7] to the observations for the countries that we do have data.[8] This leads to a total number of departures of 48.2 million, so we scaled up *all* departures[9] by 17% so that the total number of observed and modelled departures equal the total number of observed and modelled arrivals.

2.3. Domestic tourism

For most countries, the volume of domestic tourist flows is derived using 1997 data

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contained in the Euromonitor (2002) database. For some other countries, we rely upon alternative sources, such as national statistical offices, other governmental institutions or trade associations. This implies that the definitions and data quality varies. Data are mostly in the form of number of trips to destinations beyond a non-negligible distance from the place of residence and involving at least one overnight stay. For some countries, such data format was not available and we resorted to either the number of registered guests in hotels, campsites, hostels etc., or the ratio between the number of overnight stays and the average length of stay. The last two formats underestimate domestic tourism by excluding trips to friends and relatives; nevertheless, we included such data for completeness.

In general, the number of domestic tourists is less than the regional population; however, in 22 countries, people take domestic holidays more than once per year. A look at the characteristics of such countries shows that these are generally rich countries, endowed with plenty of opportunities for domestic tourism and are large (or at least medium-sized) countries. This definition fits in particular Scandinavian countries (e.g. 4.8 domestic tourists per resident in Sweden) but also Canada, Australia and the USA.[10] In the USA, the combination of a large national area, a large number of tourist sites and high per capita income contribute to explain why, on average, an average American took a domestic holiday 3.7 times in 1997. Distance from the rest of the world is also important and this is most probably the explanation for Australia and New Zealand.

We filled the missing observations using two regressions. We interpolated total tourism numbers using

$$\ln\frac{T_i}{Pop_i} = \underset{0.83}{-1.67} + \underset{0.10}{0.93}\ln Y_i \qquad N = 63;\ R^2_{adj} = 0.60 \tag{3}$$

The ratio of domestic and international holidays was interpolated using

$$\begin{aligned}\ln\frac{D_i}{T_i} = {} & \underset{1.19}{-3.75} + \underset{0.42}{0.83}\cdot 10^{-1}\ln Area_i \\ & + \underset{0.30}{0.93}\cdot 10^{-1}\ln Coast_i \\ & + \underset{0.32}{0.16}\cdot 10^{-1}T_i - \underset{1.11}{0.29}\cdot 10^{-3}T_i^2 \\ & + \left(\underset{0.12}{0.16} - \underset{1.24}{4.43}\cdot 10^{-7}Y_i\right)\ln Y_i \\ N = 63;\ & R^2_{adj} = 0.36\end{aligned} \tag{4}$$

Data sources are as previously discussed. The temperature parameters are not statistically significant from zero at the 5% level, but they are jointly significant. 'Observations' for 1995 were derived from the 1997 observations through dividing the latter by the population and per capita income growth between 1995 and 1997, correcting the latter for the income elasticity of Equations 3 and 4.

For the total (domestic and foreign) number of tourists, the world total is 12.0% higher if we include the interpolated tourist numbers, that is, 4.0 billion versus 3.6 billion tourists. The observed world total includes those countries for which we have observed both domestic tourists and international arrivals. For domestic tourists only, the observations add up to 3.1 billion tourists, and 3.5 billion tourists with interpolation, a 12.1% increase.

Note that Equations 3 and 4 can be used to derive international departures, just like Equation 2. The correlation coefficient between these two alternatives is 99.8%. We prefer Equation 2 for its simplicity.

2.4. Regional tourism

Regional tourism data were taken from national statistical offices or tourism authorities. One exception is Canada, for which we had to look at the provincial statistical offices instead. Another exception is the EU, where we relied on the supranational statistical office EuroStat, using data on NUTS2, sometimes NUTS1 or NUTS3[11] level. Unfortunately, the EU data does not cover all of the EU countries; none of the accession countries has regional data, and not even all of the original EU countries report regional data; for these countries, we resort to the number of tourist beds.

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The regional tourism data comes in all sorts of specifications: tourists, tourists in hotels, bed nights, border crossings, expenditures, hotel capacities (beds) or pleasure parties. For every country for which we have regional information, we used whatever information we had to give each region its share in the nation. We use this share to apportion the national data to the regions.

Thus, in our database, regional tourism numbers equal the national number (from the international databases) times the regional share (from the national database). We do this so that the tourism numbers in countries and parts of countries all derive from a single, internally consistent, international database. Supplementary, national data are used only for within-country patterns.

For most countries, regional tourism isreported separately for domestic tourists and international tourists. Domestic regional tourism patterns are generally very different from international regional tourism patterns. Some countries report only on international tourists and a few on domestic and international tourists combined; most countries that report only hotel capacities do not distinguish domestic and international tourists. For those countries, we assume that domestic and international tourists behave the same, for want of better information: Although the differences between domestic and international patterns are clear, one cannot predict the domestic pattern from the international pattern or *vice versa*.

Regional tourism data seldom extend over more than a few years, and the data are typically more recent than 1995, the base year for our national statistics. We use the year closest to 1995.

We searched for regional tourism data for all countries that are in the top 25 of international, domestic or total tourist destinations.[12] The countries for which we have regional data cover 79% of all international tourism and 78% of all domestic tourism. For countries without regional data, we use the area of the region, essentially assuming that tourists spread evenly over a country.

Figure 1 shows the normalised Herfindahl–Hirschmann Index (HHI)

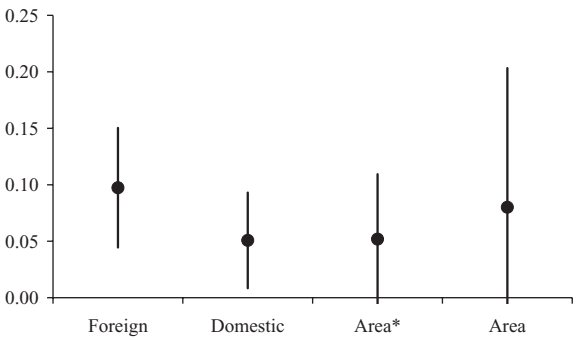

Figure 1. The mean plus and minus the standard deviation of the normalised Herfindahl–Hirschmann Index (Equation 5) per country for foreign tourists, domestic tourists, and area; area* is limited to those countries for which regional tourism data is available.

$$NHHI_c = \frac{\sum_{i=1}^{N_c}\left(\frac{T_i}{T_c}\right)^2 - \frac{1}{N_c}}{1-\frac{1}{N_c}} \qquad (5)$$

Where T_i is the number of tourists in region i of country c, and T_c is the total number of the tourists in country c; the HHI is indeed the sum of squared market shares; as the number of regions N_c differs substantially between countries, normalisation is necessary; it is done such that the normalised index lies between 0 and 1, where 0 denotes equal market shares and 1 denotes that all tourists are in one single region.

Figure 1 shows that our assumption of spreading tourists equally over the surface of a country does not lead to an obvious distortion of concentrations of domestic tourists, and perhaps implies a small downward bias for foreign tourists.

3. RESULTS

Table 1 shows the 10 countries with the highest tourism demand, measured in the number of tourists. The USA leads in domestic tourism, followed by China, India, Brazil and, surprisingly, the UK. The top 10 countries cover 77.9% of all domestic tourism. In international tourism, Germany leads, followed by the USA, the UK, Russia and Malaysia. Ranks 4 and 5 are surprising, as is Hungary in rank 10. Probably,

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temporary labour migration is misclassified as tourism. The top 10 countries cover 60.2% of all international tourism. Table 1 also shows total (domestic plus international) tourism demand. This ranking is dominated by domestic tourism. The top 5 countries are identical, but below that Germany and France advance at the expense of Poland. The top 10 countries cover 73.4% of world tourism demand.

Table 2 shows the 10 countries with the highest tourism supply, measured in number of tourists. For domestic tourism, supply equals demand. France is the most popular destination for international tourists, followed by the USA, Spain, Italy and the UK. The top 10 destinations cover 52.2% of all supply. Table 2 also shows total (domestic plus international) tourism supply. Again, the ranking is dominated by domestic tourism. The USA is the most popular tourist destination, followed by China, India, Brazil and the UK. France, the most popular destination for international tourists, ranks sixth. The top 10 covers 72.0% of world tourism supply.

Figure 2 shows the numbers of domestic tourists per country. Countries with larger and richer populations have more domestic tourists. Figure 3 shows the numbers of international departures per country. Countries with larger and richer populations have more international tourists, but compared to Figure 2, income matters more. Another factor is that smaller countries have more international departures (relative to total tourist numbers). An exception in Figures 2 and 3 is Russia, which has little domestic tourism and a lot of

Table 1. Top 10 tourist origins for domestic holidays, international holidays and all holidays by tourist numbers (millions)

Domestic		International		Total	
Country	Number	Country	Number	Country	Number
United States	999.0	Germany	87.4	United States	1058.5
China	644.0	United States	59.5	China	649.3
India	320.0	United Kingdom	49.1	India	323.6
Brazil	176.2	Russian Federation	25.0	United Kingdom	182.7
United Kingdom	133.6	Malaysia	24.2	Brazil	179.2
Indonesia	107.0	France	21.9	Germany	169.6
Poland	86.7	Canada	21.3	Indonesia	109.1
Germany	82.2	Italy	18.7	Canada	102.3
Canada	80.9	Japan	17.9	France	96.4
Japan	77.8	Hungary	15.3	Japan	95.7

Table 2. Top 10 tourist destinations per country for domestic holidays, international holidays and all holidays by tourist numbers (millions)

Domestic		International		Total	
Country	Number	Country	Number	Country	Number
United States	999.0	France	60.0	United States	1042.4
China	644.0	United States	43.4	China	664.0
India	320.0	Spain	39.3	India	322.1
Brazil	176.2	Italy	31.1	Brazil	178.2
United Kingdom	133.6	United Kingdom	23.5	United Kingdom	157.1
Indonesia	107.0	Hungary	20.7	France	134.5
Poland	86.7	Mexico	20.2	Indonesia	111.3
Germany	82.2	China	20.0	Poland	105.9
Canada	80.9	Poland	19.2	Canada	97.9
Japan	77.8	Austria	17.2	Germany	97.0

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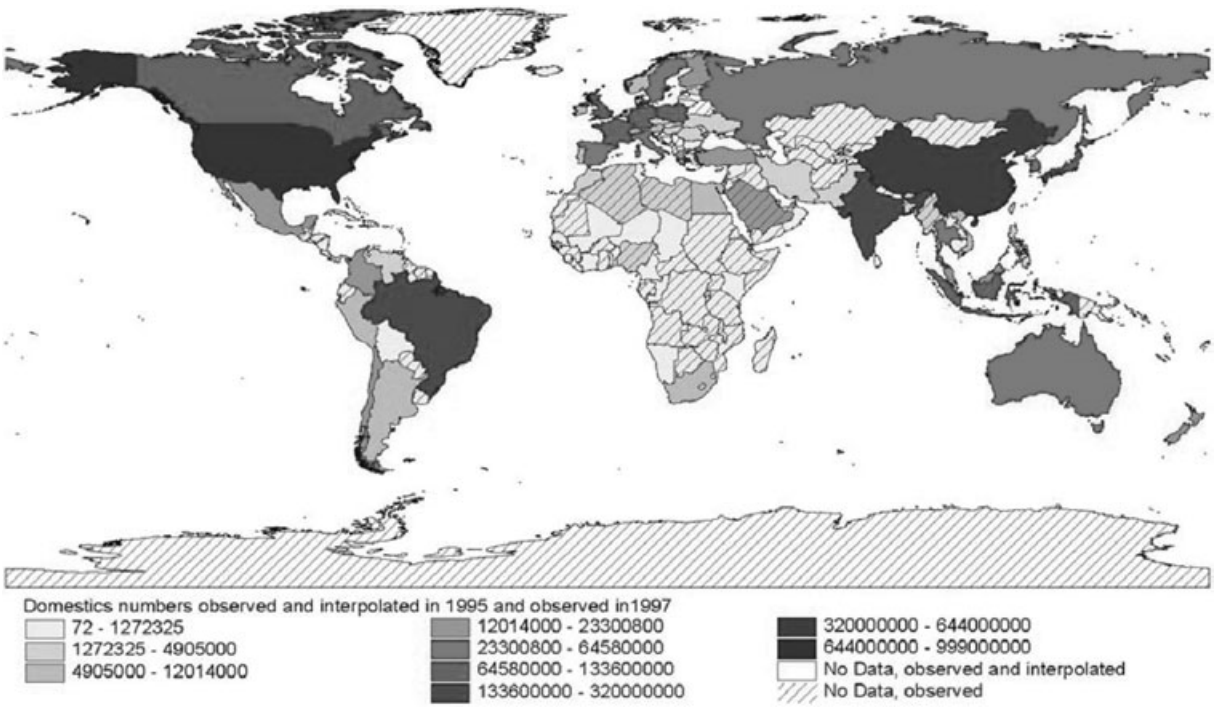

Figure 2. Domestic holidays per country, observed and interpolated (shaded).

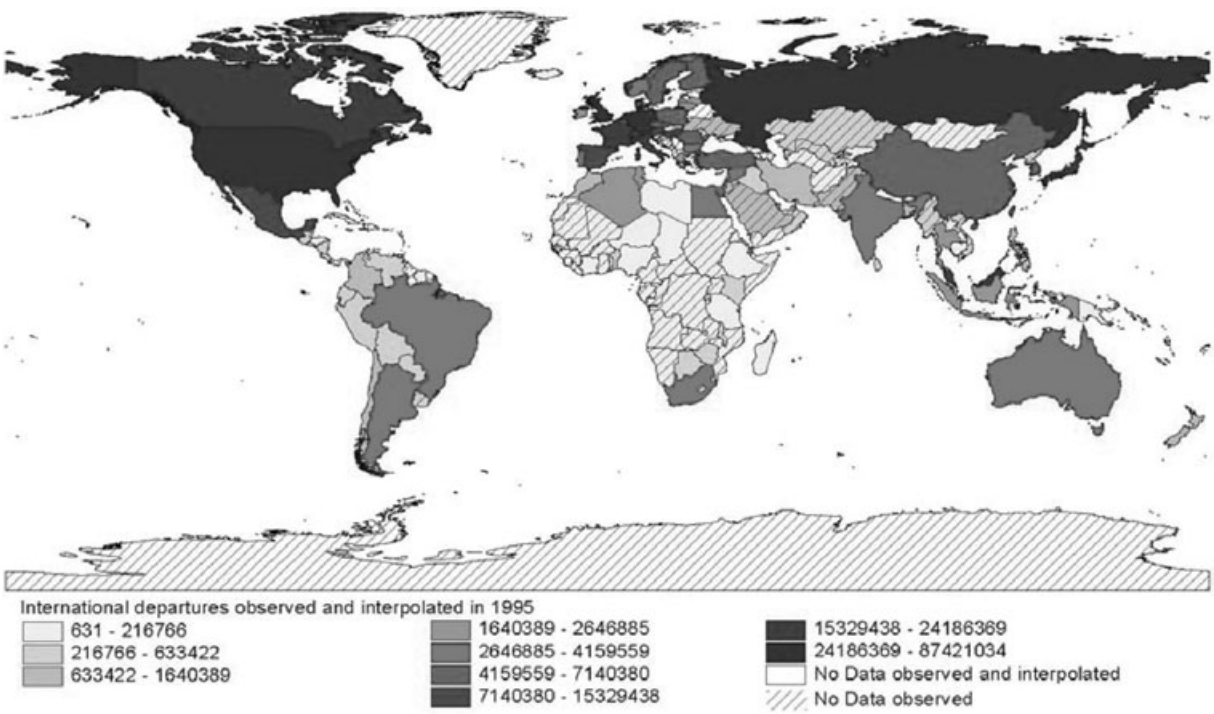

Figure 3. International departures per country, and observed and interpolated (shaded).

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international tourism for its size and income. Figure 4 shows international arrivals. North America, Western and Central Europe, Russia and China are the most important destinations. Tropical countries and countries of the southern hemisphere receive only a fraction of international tourists. Figure 5 shows the total number of tourists from and in a country. Figure 5 confirms that domestic tourism dominates international tourism, as already seen from Tables 1 and 2. The clear exceptions are Canada and Russia where there are substantially less tourists coming in than going out. Figure 6 shows the share of international tourists from and in a country. People from larger countries are less inclined to take a foreign holiday (but their numbers still add up, see Figure 2), and people in Western and Central Europe are more so inclined. In Africa, West Asia and Latin America, the pattern is more erratic, also because of the interpolation of data, but people from poorer countries are more inclined to take a foreign holiday (as only the very wealthy travel). The share of international in total tourist numbers is higher in Southern Europe and Mexico than elsewhere in Europe and North America. The pattern for Africa, West Asia and Latin America is again more erratic; however, if majority of the holidaymakers from a country go abroad, then the tourism sector within that country is logically dominated by foreign visitors.

Table 3 shows the 25 regions with the highest share in the tourism market. For international tourists, the three most popular destinations are Paris (Ile de France), London and Hong Kong. Other popular cities are Singapore (11th), Venice (Veneto, 12th), New York (13th), Madrid (20th), Macau (22nd) and Mexico City (Distrito Federal, 24th) although cities like Barcelona (in Cataluña, 8th) and Rome (in Lazio, 19th) also attract many tourists. Outside the cities, the Balearic Islands and the Provence are most popular, followed by the Pearl River Delta (Guangdong),[13] Andalucia, Ontario and Yucatan (Quintana Roo). Tirol (14th) is the most popular mountain destination; Tirol is popular during summer too.

For domestic tourism, the situation is completely different. The top 4 destinations are in the USA (California, Florida, Texas and New York), followed by Sichuan and Beijing

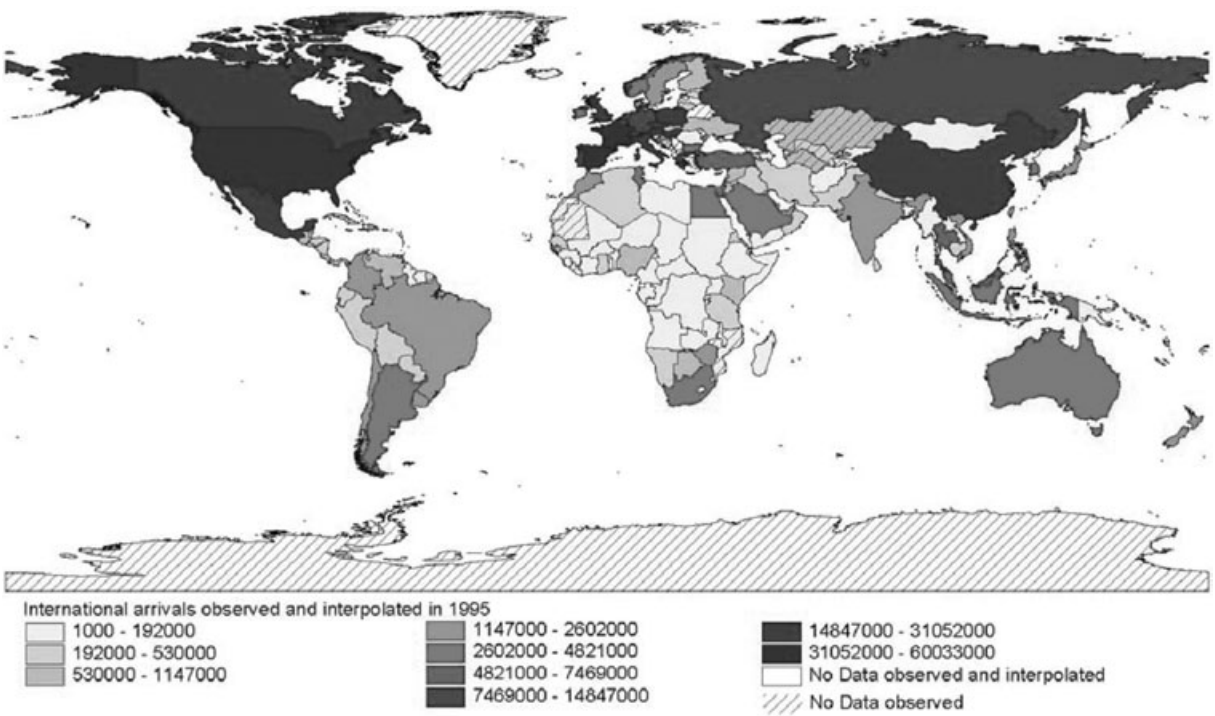

Figure 4. International arrivals per country, observed and interpolated.

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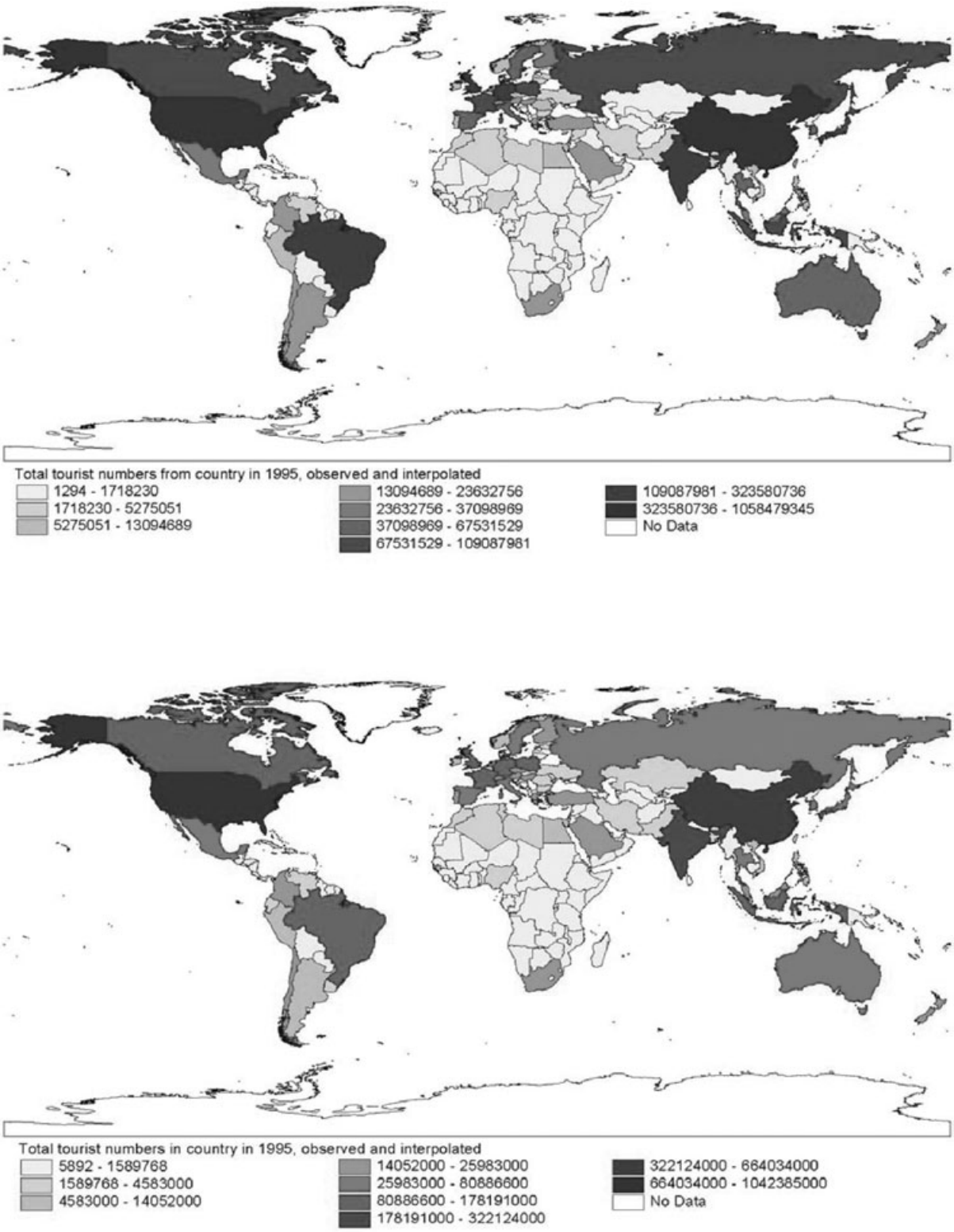

Figure 5. Total number of tourists from a country (top panel) and in a country (bottom panel).

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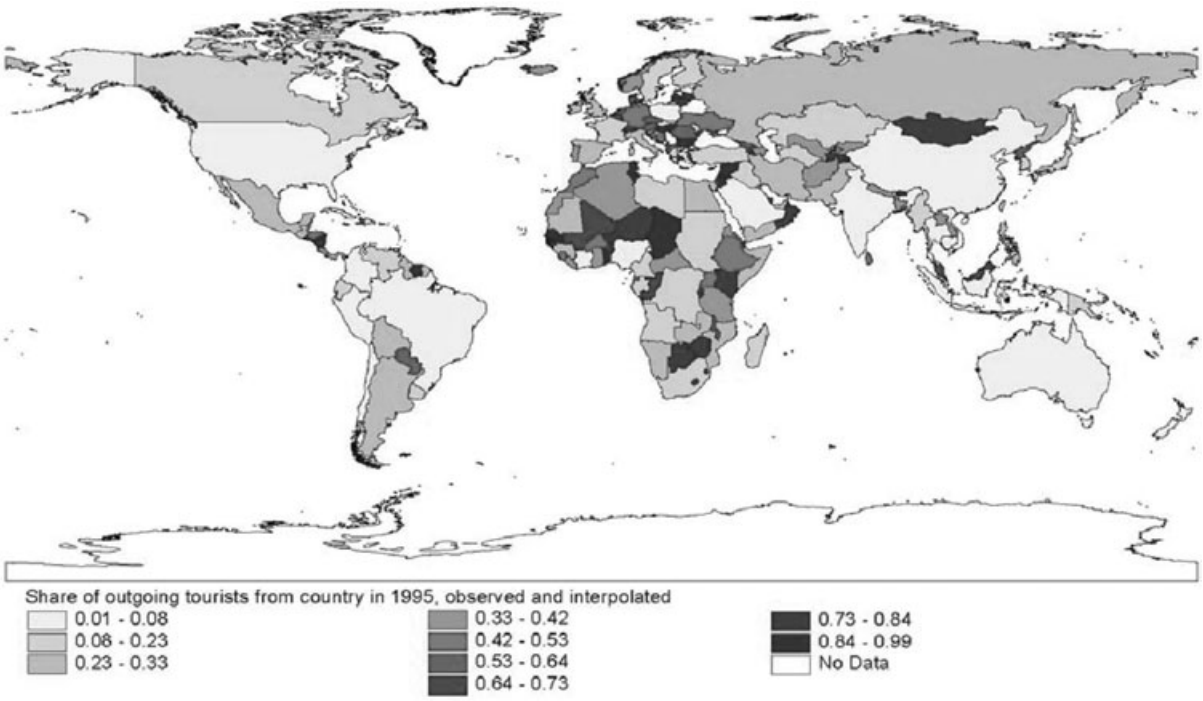

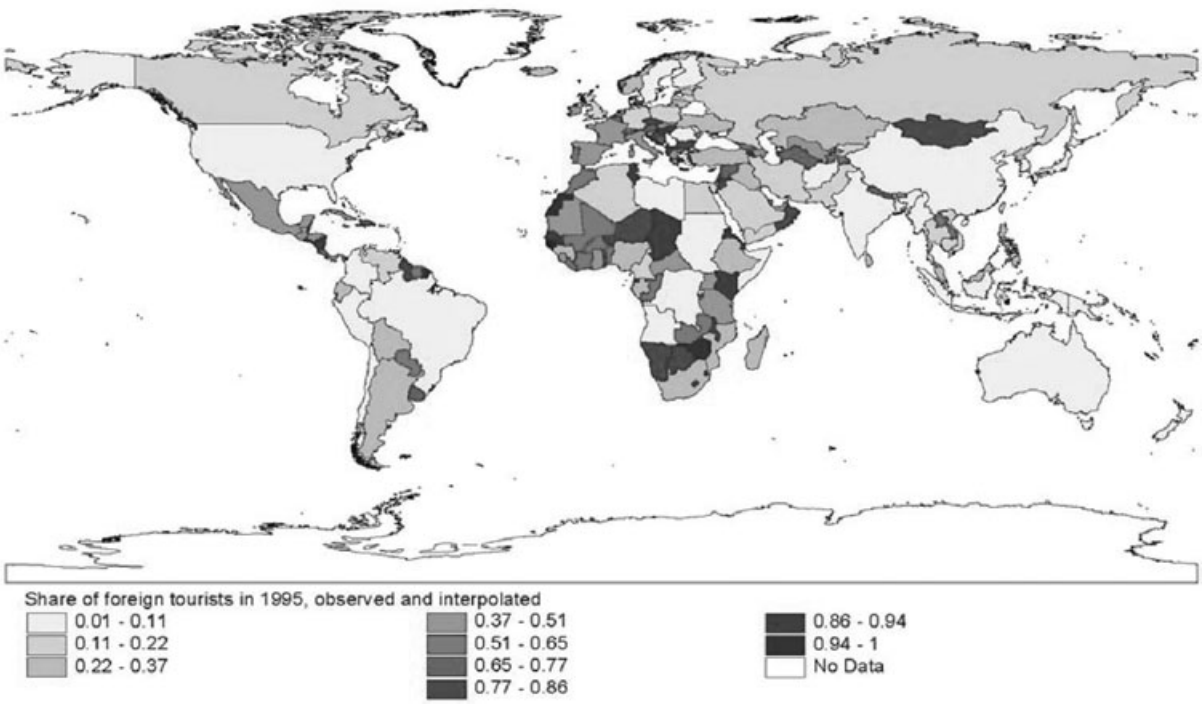

Figure 6. The share of outbound tourists in all tourists from a country (top panel) and the share of international tourists in all tourists in a country (bottom panel).

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Table 3. Top 25 tourism destinations per region for domestic holidays, international holidays and all holidays by market share (percentage)

International			Domestic			Total		
Region	Country	Share	Region	Country	Share	Region	Country	Share
Île de France	France	3.43	California	United States	3.66	California	United States	3.29
London	United Kingdom	1.88	Florida	United States	2.49	Florida	United States	2.29
Hong Kong	China	1.80	Texas	United States	1.90	Texas	United States	1.66
Illes Balears	Spain	1.71	New York	United States	1.71	New York	United States	1.62
Provence-Alpes-Côte d'Azur	France	1.45	Sichuan	China	1.52	Sichuan	China	1.32
Guangdong	China	1.34	Beijing	China	1.48	Beijing	China	1.31
Andalucia	Spain	1.32	Madhya Pradesh	India	1.33	Illinois	United States	1.15
Cataluña	Spain	1.32	Illinois	United States	1.31	Madhya Pradesh	India	1.14
Ontario	Canada	1.22	Jiangsu	China	1.24	Jiangsu	China	1.10
Quintana Roo	Mexico	1.14	Shandong	China	1.23	Shandong	China	1.07
Singapore	Singapore	1.13	Nevada	United States	1.17	Nevada	United States	1.06
Veneto	Italy	1.12	Shanghai	China	1.13	Guangdong	China	1.04
New York	United States	1.10	Zhejiang	China	1.03	Shanghai	China	1.00
Tirol	Austria	1.10	Rajasthan	India	1.02	Zhejiang	China	0.91
Florida	United States	1.02	Guangdong	China	0.99	Rajasthan	India	0.88
California	United States	0.99	*Amazonas*	*Brazil*	*0.94*	Ontario	Canada	0.88
Canarias	Spain	0.86	Maharashtra	India	0.94	*Amazonas*	*Brazil*	*0.81*
Toscana	Italy	0.80	New Jersey	United States	0.90	Maharashtra	India	0.81
Lazio	Italy	0.76	Uttar Pradesh	India	0.88	New Jersey	United States	0.80
Comunidad de Madrid	Spain	0.75	Pennsylvania	United States	0.87	Pennsylvania	United States	0.77
San Marino	*San Marino*	*0.74*	Georgia	United States	0.87	Georgia	United States	0.77
Macau	China	0.74	Hubei	China	0.86	Uttar Pradesh	India	0.76
Rhône-Alpes	France	0.73	Andhra Pradesh	India	0.82	Hubei	China	0.75
Distrito Federal	Mexico	0.66	Ontario	Canada	0.82	Île de France	France	0.75
Lombardia	Italy	0.62	Liaoning	China	0.81	Andhra Pradesh	India	0.71

Data in italics are interpolated, not observed.

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in China, and Madhya Pradesh in India. The rest of the top 25 destinations are mostly in China, India and the USA. As domestic tourism outnumbers international tourism by far, the list of most popular tourist destinations is almost identical to the list of domestic destinations. Paris, number 1 on the list of international tourist destinations, ranks 24th on the all tourists list (and 84th on the domestic list); London ranks 52nd and Hong Kong 83rd.

The regional distribution of tourists is very skewed. For international tourists, the Gini coefficient is 85%, for domestic tourists even 90% and for all tourists, it is 88%.

Figure 7 shows the regional distribution of domestic and international tourists in North America. For domestic tourists, the USA and the southern half of Canada are most popular, with California, Florida, New York, Texas and Ontario standing out. For international tourists, the pattern is different. First, Canada and Mexico gain in importance because there are more people from the USA travelling to Canada and Mexico than *vice versa*. Second, the US interior attracts almost no international visitors. This confirms Figure 1: International tourists are more concentrated.

Figure 8 shows the regional distribution of domestic and international tourists in Southeast Asia. Java stands out in domestic tourism, while Thailand and Malaysia are more important for international tourism. In Thailand, domestic tourism is spread more or less evenly over the country, whereas international tourists are concentrated in three places. This confirms Figure 1.

Figure 9 shows the regional distribution of domestic and international tourists in East Asia. Domestic tourists in China are more or less evenly spread over the eastern half of the country, but avoid the west and the north. International tourists in China are almost all on the seaboard, particularly Guangdong, and in Beijing. This confirms Figure 1. Tourists in South Korea prefer the east over the west. Tourists are spread evenly over Japan.

Figure 10 shows the regional distribution of domestic and international tourists in Europe. International tourists are concentrated in selected places along the Mediterranean, the Southern Alps, and London. Other areas that stand out for being more popular than the surrounding areas include North Holland (Amsterdam), Hamburg, Berlin, the area around Prague, and the Baltic coast of Poland; the landlocked heart of South-West France stands out for being less popular. Domestic tourists are more evenly spread than are international tourists. The West of England and Wales, the Atlantic coast of France, northern Germany and Bavaria are important destinations for domestic tourists, while Crete, Mallorca and North Holland are hardly featured on the map.

Together, Figures 7–10 show that domestic tourists and international tourists have different preferences. It is no surprise that long-distance travellers would expect different things from a holiday than would short-distance travellers. In Western Europe, where distances are shorter, travel agencies, advertisements and reputations are likely explanations for the difference in preferences.

4. DISCUSSION AND CONCLUSION

We have presented a new, global database of domestic and international tourist numbers at the national and subnational level. The database is publicly available and should serve students of tourism, whether in academia, government or business. We also show selected results.

A few results are worth emphasising. First, domestic tourism is far more important than international tourism. Second, China, India, Brazil and Indonesia are important tourism markets, surpassing Germany, France and Japan in either supply or demand or both. Third, cities are magnets for international tourists; domestic tourists show considerably less interest. In general, domestic tourists travel to different places than international tourists do. Fourth, the spatial concentration of tourism is very high.

As with any database, the number of caveats is large. International tourism movements are hard to measure, as tourists mix with other travellers, other travellers are disguised as tourists, and some borders are easier to cross unnoticed than others. Domestic tourism movements are even harder to track. We relied as much as we could on comprehensive, internationally consistent databases, but we had to supplement this data with data from other

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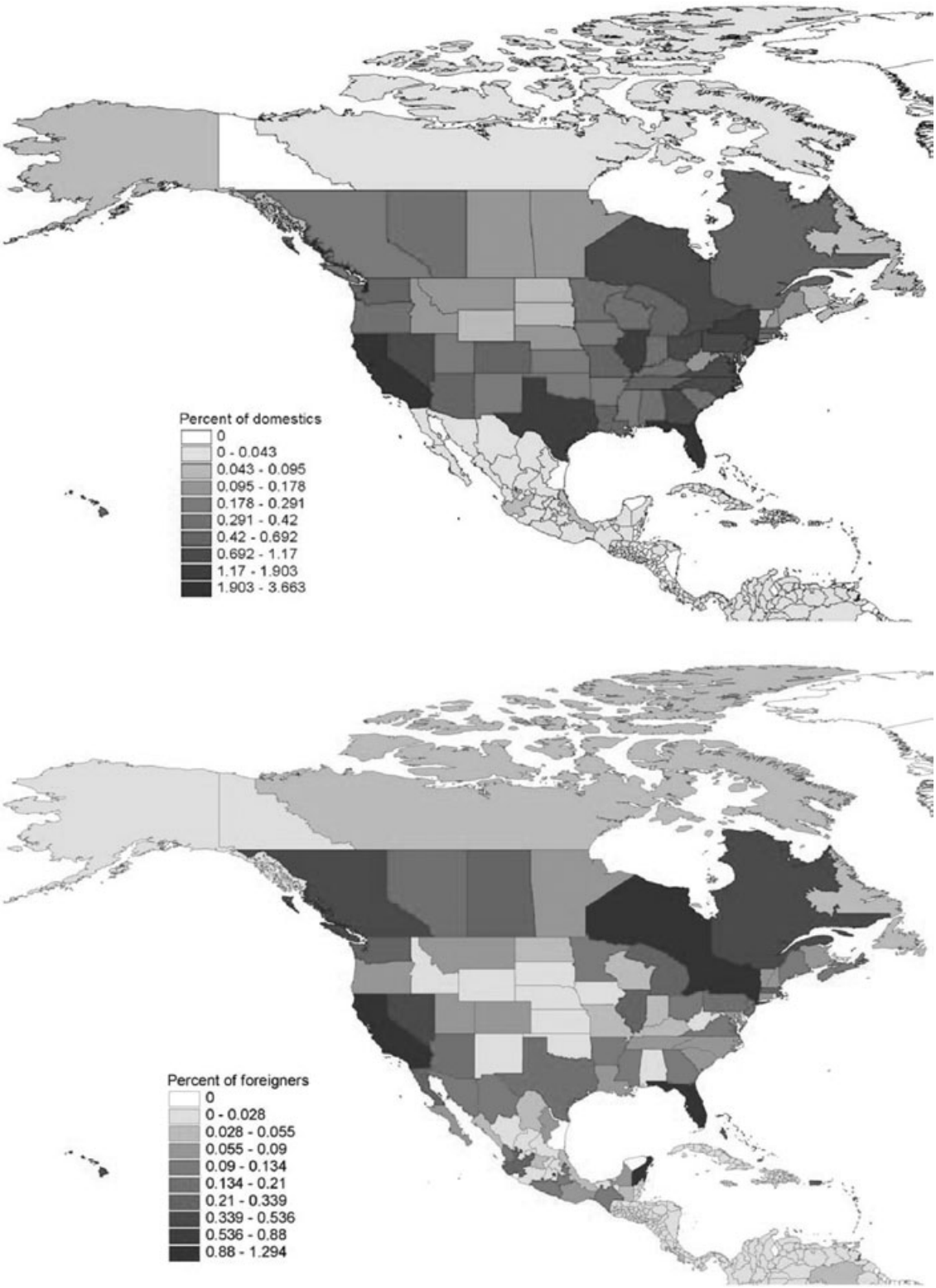

Figure 7. Regional share of tourists in North America, domestic (top panel) and foreign (bottom panel).

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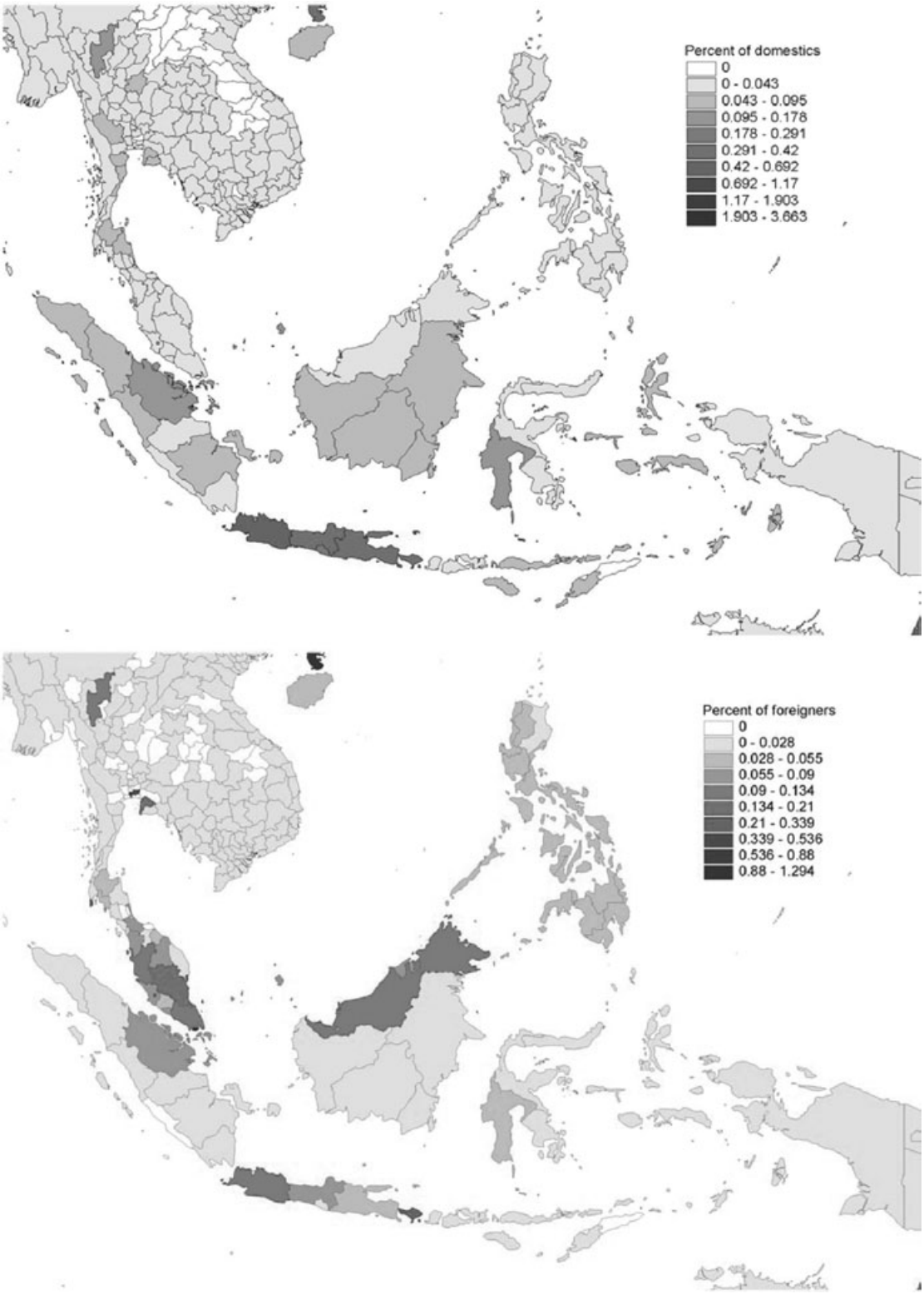

Figure 8. Regional share of tourists in South-East Asia, domestic (top panel) and foreign (bottom panel).

DOI: 10.1002/jtr

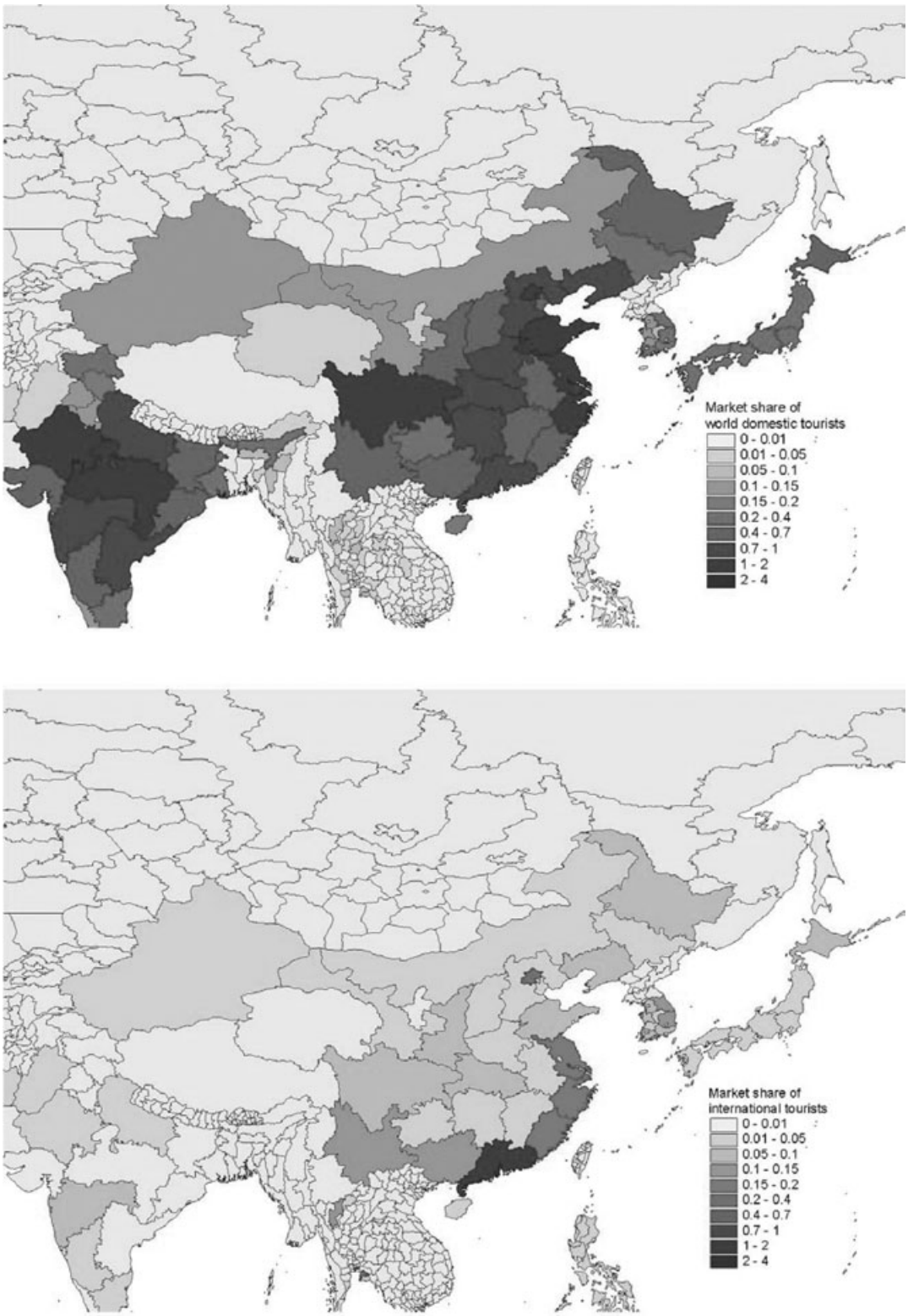

Figure 9. Regional share of tourists in East Asia, domestic (top panel) and foreign (bottom panel).

DOI: 10.1002/jtr

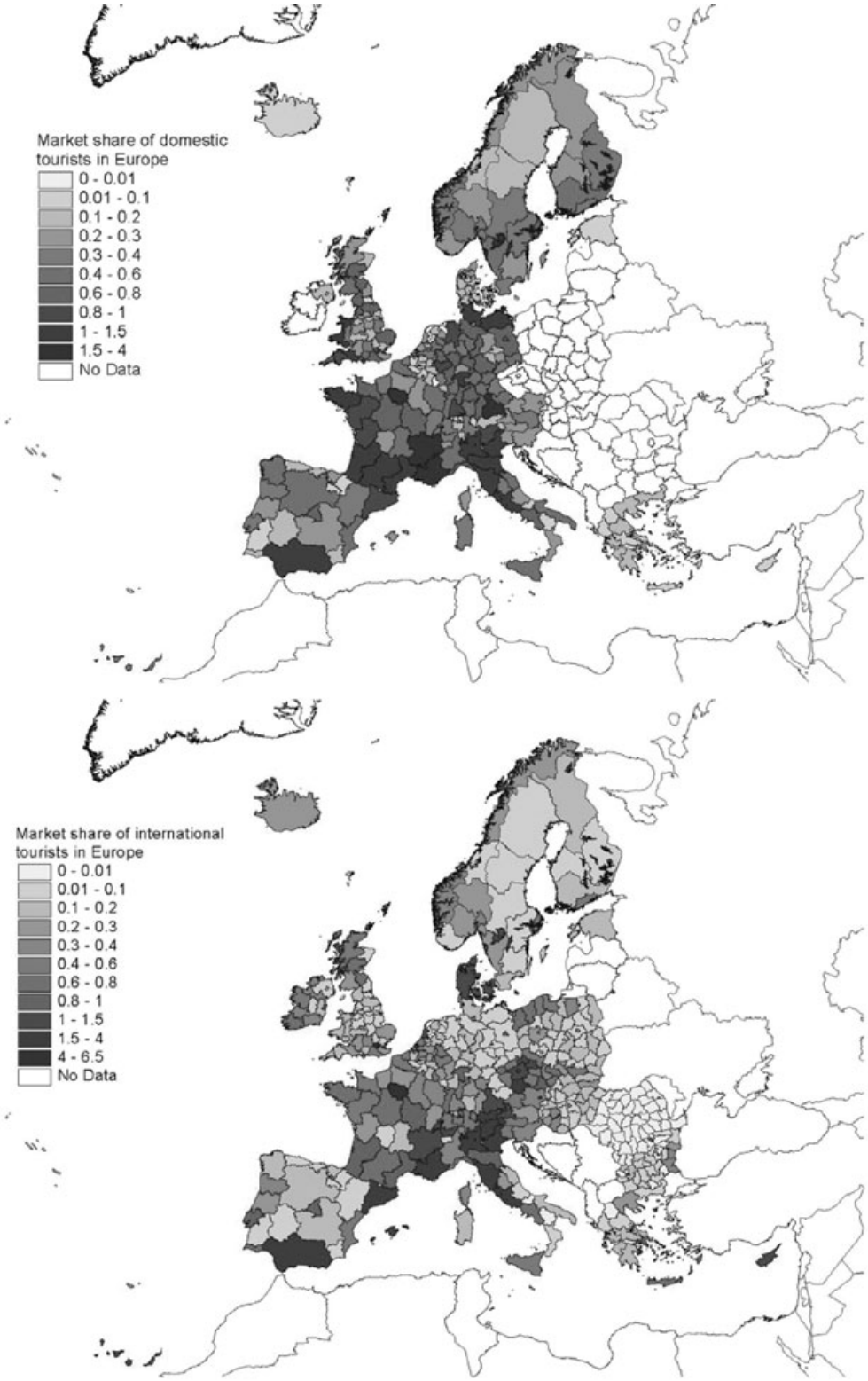

Figure 10. Regional share of tourists in Europe, domestic (top panel) and foreign (bottom panel).

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sources. Even so, there is a fair degree of interpolation in our database. We use data from different years and had to rescale observations to our base year of 1995.

A number of issues present themselves for future work. Obviously, the database will need to be updated to more recent years when those data become available. At the moment, we present the number of tourists per year. Tourism is seasonal, however, and the quarterly or even monthly numbers would be much more useful. Besides, the number of tourists, length of stay, expenditures and resource use would be good additions, as would be the characterisation of the destinations. For analytical purposes, it would be good to distinguish different types of tourists (e.g. family visits and summer holidays) and to add day trips.

Nonetheless, the database presented here is one of a kind, and hopefully as useful to others as it promises to be to us. Updates, corrections and additions are more than welcome under the condition that the data will remain in the public domain.

ACKNOWLEDGEMENTS

Alvaro Calzadilla, Poul Grashof, Marie Guillore, Malgorzata Zbylut and particularly Jenny Behm helped with the data and the maps. The CEC DG Research through the DINAS-Coast project (EVK2-2000-22024), the US National Science Foundation through the Center for Integrated Study of the Human Dimensions of Global Change (SBR-9521914), the International Max Planck Research School of Earth System Modelling, the Ecological and Environmental Economics Programme of the International Centre for Theoretical Physics and the Michael Otto Foundation for Environmental Protection provided welcome financial support. All errors and opinions are ours.

NOTES

1. This may come as a surprise, as Limousin is both pleasant and beautiful. However, it cannot compete with its neighbouring departments, which have better infrastructure as well as coast (M. Guillore, Personal Communication, 2004).

2. The reported departures from the Czech Republic were divided by 10; comparison to earlier and later years shows that the 1995 data contained typographical error.

3. However, we did correct the Polish departure data. According to Statistic Poland, only 12% of the reported international departures are tourists (Central Statistical Office Poland, http://www.stat.gov.pl/english/serwis/polska/rocznik11/turyst.htm).

4. The estimation procedure started with a large number of explanatory variables, including precipitation, number of world heritage sites, political stability and a range of other indicators. Explanatory variables that are individually and jointly insignificant were eliminated. The resulting specification is shown. We experimented with different representations of temperature (e.g. temperature of the hottest month); the annual average temperature describes the data best.

5. The data on per capita income were taken from WRI (2002), supplemented with the data from CIA (2002); the data on area and the length of international borders are from CIA (2002); and the data on temperature from New *et al.* (1999). All data can be found at http://www.fnu.zmaw.de/HTM.5681.0.html

6. These are mostly African countries and small dependencies; however, data from Pakistan and Taiwan are also missing. Luxemburg is the only OECD country without departures data.

7. The estimation procedure started with a large number of explanatory variables. Explanatory variables that are individually and jointly insignificant were eliminated.

8. The data on population were taken from WRI (2002), the data on the number of land borders were taken from CIA (2002).

9. Scaling up only the interpolated departures leads to distortions, as many small countries do not report departure data. Besides, while virtually all countries check who enters (and so have a basis for counting arrivals), most countries let their residents leave freely (and thus, do not necessarily count departures that well). Therefore, departures are probably under-reported even if there are data available. Note that by equating total arrivals and total departure numbers, we

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assume that tourists visit one country per trip only.
10. Poland, ranking 8th, is particularly active notwithstanding substantially lower per capita income than the rest of the top 10 countries; this may be because (illegal) seasonal labour migration is registered as tourism.
11. NUTS0 is national, NUTS4 and NUTS5 municipal, and NUTS1–3 are somewhere in between, depending on the country; NUTS4 and NUTS5 are now LAU1 and LAU2.
12. Countries for which we tried but failed to find regional data are Algeria, Brazil, Chile, Colombia, Egypt, Morocco, New Zealand, Russia, South Korea, Tunisia and Vietnam.
13. Guangdong derives its popularity from its proximity to and ties with Hong Kong (Chow, 1988); it also borders Macau.

APPENDIX 1. DATA SOURCES

International tourism
WRI, 2002: *World Resources Database 2002–2003*. World Resources Institute, Washington, D.C., USA. http://www.earthtrends.wri.org/

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Domestic tourism

Country	Source	Link	Year
Albania	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Argentina	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Australia	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Austria	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Belgium	Nationaal Instituut voor de Statistiek, Statistiek van Toerisme en Hotelwezen	http://www.statbel.fgov.be/figures/d73_nl.asp#1	1997
Bosnia and Herzegovina	Federal Office of Statistics	http://www.fzs.ba/Podaci/OSNOVNE%20INFORMACIJE%20O%20FEDEng.htm	2001
Brazil	Tourism in the Northeast of Brazil, Banco do Nordeste, Fortaleza,		
Bulgaria	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Cambodia	Leisure Cambodia	http://www.leisurecambodia.com/Leisure_Cambodia/No.09/phrase_month.htm	2000
Cameroon		http://www.tourism-21.org/f/infos/stats/cameroun.htm	1999
Canada	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Chile	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
China	National Tourism Administration	http://www.chinatour.com/data/data.htm	1997
Colombia	El Pais, 14th January 2003	http://elpais-cali.terra.com.co/paisonline/notas/Enero142003/A814N1.html	2002
Cote d'Ivoire	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Croatia	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Cuba	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997

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Cyprus	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Czech Rep	Statistical Office	http://www.czso.cz/eng/figures/9/92/e190899/data/tab4.pdf	1997
Denmark	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Egypt	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Estonia		http://www.hurmaster.ee/eng/tourism1.htm	1997
Fiji	Bureau of Statistics	http://www.statsfiji.gov.fj/f_tourism.html	2001
Finland	Statistics Finland	http://www.mek.fi/web/MekEng/publish.nsf/(PublishedSheets2)/6E68D04CECBC7560C2256D750025FACC?openDocument&sheetList=TourismStatistics	2002
France	INSEE — Direction du Tourisme — Partenaires régionaux	http://www.tourisme.gouv.fr/STAT-CONJ/statistiques.htm#hotellerie	2000
Germany	Federal Statistical Office	http://www.destatis.de/basis/e/tour/tourtab8.htm	1997
Greece	National Tourism Organization	http://www.gnto.gr/2/01/eb10012.html	1997
Hong Kong	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Hungary	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Iceland	Statistics Iceland	http://www.hagstofa.is/template44.asp?PageID=932	2002
India	Express Hotelier & Caterer (January 6, 2003)	http://www.tourismofindia.com/misc/time.htm	2000
Indonesia	Tourism Indonesia (2003)	http://www.tourismindonesia.com/news/270303.asp	2001
Ireland	Research & Strategic Planning Fáilte Ireland	http://www.failteireland.ie/downloads/Domestic_Brief_2002.doc	1997
Italy	Istituto Nazionale di Statistica-Rilevazione sul movimento nelle 1999	http://www.istat.it/Comunicati/Fuori-cale/il-Turiscmo-nel-1999-e-le-aspettativ.htm	1999

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Domestic tourism *Continued*

Country	Source	Link	Year
Japan	Statistics Bureau of the Ministry of Public Management, Home Affairs, Posts and Telecommunications	http://www.stat.go.jp/english/data/shakai/2.htm	1996
Kenya	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Korea, Rep	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Latvia	Central Statistical Bureau	http://www.csb.lv/Satr/rad/N1a.cfm?akurs03=N1a	1997
Liechtenstein	Amt für Volkswirtschaft /	http://llvweb.liechtenstein.li/lisite/html/liechtenstein/index.jsp?treeId=WIRT_en_EN&topicId=0.2.2&sync=true	1995
Lithuania	Statistik Statistics Lithuania, State Border Guard Service, Department of Tourism	http://www.tourism.lt/statist/compendium.htm	1997
Luxembourg	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Macau	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Macedonia	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Malaysia	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Mali	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Mexico		http://nt.presidencia.gob.mx/Informes/2002Fox2/website/docs/pdfs/2info_anexo_344-348.pdf	1997
Morocco	Haut Commissariat au Plan, Direction de la Statistique	http://www.statistic.gov.ma/tourisme.htm	2000

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Netherlands	Centraal Bureau voor de Statistiek, Continue Vakantie Onderzoek, and Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
New Zealand	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Norway	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Oman	Ministry of Commerce & Industry, Directorate General of Tourism	http://www.mocioman.gov.om/tourism/statistics.html	1997
Pakistan	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Peru	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Philippines	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Poland	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Portugal	Instituto Nacional de Estatistica	http://www.ine.pt/prodserv/indicadores/quadros.asp?CodInd=56	2002
Puerto Rico	Puerto Rico Business Review, (2003) Vol 27 N.4, Government Development Bank	http://www.gdb-pur.net/Economia/PRBusiness/PRBusinessEsp.htm	2001
Romania	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Russian Federation	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Singapore	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Slovakia	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Slovenia	Tourism, Hotels and Restaurants Association	http://www.gzs.si/sloexport/default.asp?MenuID=51&Menu=Tourism%20and%20Catering#stat	1997

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Domestic tourism *Continued*

Country	Source	Link	Year
South Africa	The Mercury, 13 December 1996	http://www.und.ac.za/und/indic/archives/indicator/winter97/Tdomest.htm	2000
Spain	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Swaziland	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Sweden	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Switzerland	Reisemarkt Schweiz, St. Gallen. 1999 and 2000/01	http://old.stnet.ch/marketing/pass/files/Switzerland02.pdf	1998
Taiwan	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Thailand	Tourism Authority	http://www.tat.or.th/stat/web/static_index.php	1997
Tunisia	Central Bank, Annual Report, 2002	http://www.bct.gov.tn/francais/download/report/fiche9.pdf	2000
Turkey	Ministry of Tourism, Accommodation Statistics	http://www.tursab.org.tr/english/profile/domestic.htm	1998
United Arab Emirates	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
United Kingdom	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
United States	Euromonitor	http://www.euromonitor.com/gmid/default.asp	1997
Viet Nam	UNDP Viet Nam Country Office	http://www.undp.org.vn/mlist/develvn/031999/post62.htm	1997

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Regional tourism

Country	Source	Year	Notes
Argentina	Secretaria de Turismo y Deportes (2003)	2002	Number of hotel beds
Australia	Bureau of Tourism Research http://www.btr.gov.au/	1996 (international) 1998 (domestic)	International and domestic visitor nights
Austria	EuroStat	1995	Arrivals of residents and non-residents, NUTS2
Belgium	EuroStat	1995	Arrivals of residents and non-residents, NUTS2
Bulgaria	EuroStat	1995	Total arrivals, NUTS3
Canada	Statistics Canada (2004)	1998	Trips
Alberta	Alberta Advantage (2003)	1998	Person trips
Prince Edward Island	Tourism PEI (2003)	1998	Pleasure parties
Nova Scotia	Nova Scotia Department of Tourism and Culture (2004)	2002–3	Non-resident visitation
Quebec	Tourisme Quebec (2004)	2002–3	Number of tourists
Ontario	Ontario Ministry of Tourism and Recreation (2004)	2001–2	Overnight visits
Manitoba	Ryan Schultz, Travel Manitoba, personal communication, 2004	2001–2	Person visits
Sasketchewan	Statistics Sasketchewan (2003)	1998	Purchases of goods and services
British Colombia	BC Stats (2003)	1998	Visitor entries
Yukon, NW Territories, Nunavut	Yukon Department of Tourism and Culture (2004)	1998	Border crossings
Newfoundland	This study	1995	Ratio of international visitors to Canadian visitors assumed equal to that of Quebec
New Brunswick	This study	1995	Ratio of international visitors to Canadian visitors assumed equal to that of Quebec and Nova Scotia averaged
China	China Statistical Yearbook 2002 http://www.stats.gov.cn	2001, 2003	Number of domestic and foreign tourists

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Regional tourism *Continued*

Country	Source	Year	Notes
Cyprus	EuroStat	1995	Number of beds, NUTS3
Czech Republic	EuroStat	1995	Number of beds, NUTS3
Denmark	EuroStat	1995	Arrivals of residents and non-residents, NUTS3
Finland	EuroStat	1995	Arrivals of residents and non-residents, NUTS2
`France	EuroStat	1995	Arrivals of residents and non-residents, NUTS2
Germany	EuroStat	1995 (Saxony: 1998)	Arrivals of residents and non-residents, NUTS2
Greece	EuroStat	1995	Arrivals of residents and non-residents, NUTS2
Hungary	EuroStat	1995	Number of beds, NUTS3
India	http://www.directories-today.com/i_tourism.htm	1997	Number of foreign tourists; only for the 10 most popular states
Indonesia	Bureau of Planning and Statistics http://www.bps.go.id/sector/tourism/tables.shtml	1998	Number of domestic and foreign hotel guests
Ireland	EuroStat	1995	Number of beds, NUTS3
Italy	EuroStat	1995	Arrivals of residents and non-residents, NUTS2
Japan	Statistics Bureau		Number of employees in all lodging places for domestic tourists, hotels for foreign tourists

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Malaysia	http://www.tourism.gov.my/statistic/statistics.asp	2000	Number of domestic and foreign tourists; data for cities and tourist resorts
Mexico	Sectretaria de Turismo http://datatur.sectur.gob.mx/jsp/index.jsp	2003	Number of domestic and foreign tourists; missing data for Colima, Tamaulipas and Yucatan
Netherlands	EuroStat	1994	Arrivals of residents and non-residents, NUTS2
Norway	EuroStat	1995	Arrivals of residents and non-residents, NUTS2
Poland	EuroStat	1995	Number of beds, NUTS3
Portugal	EuroStat	1995	Arrivals of residents and non-residents, NUTS2
Romania	EuroStat	1995	Number of beds, NUTS3
Slovakia	EuroStat	1995	Number of beds, NUTS3
South Africa	Foreign: Statistics South Africa http://www.statssa.gov.za/publications/P6442/P6442December1996.pdf http://www.statssa.gov.za/publications/P6442/P6442January1997.pdf Domestic: Rule *et al.* (2001)	1995–7	Number of foreign bednights; number of domestic tourism trips
Spain	EuroStat	1995	Arrivals of residents and non-residents, NUTS2
Switzerland	EuroStat	1995, 1998	Arrivals of residents and non-residents, NUTS2
Sweden	EuroStat	1995, 1998	Arrivals of residents and non-residents, NUTS2
Thailand	Tourism Authority of Thailand	2003	Number of domestic and foreign hotel guests

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Regional tourism *Continued*

Country	Source	Year	Notes
Turkey	http://www.tourismturkey.org/	1997	Number of beds in licensed accommodation establishments by region, downscaled to province
UK	EuroStat	1998	Arrivals of residents and non-residents, NUTS2
USA	ITA (2004a,b), US Census Bureau (2002)	1999	Expenditures by domestic tourists, number of foreign tourists
Other countries	This study	1995	Number of domestic and foreign tourists proportional to the area of the region

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APPENDIX 2. COMPARISON TO DATA FOR OTHER YEAR

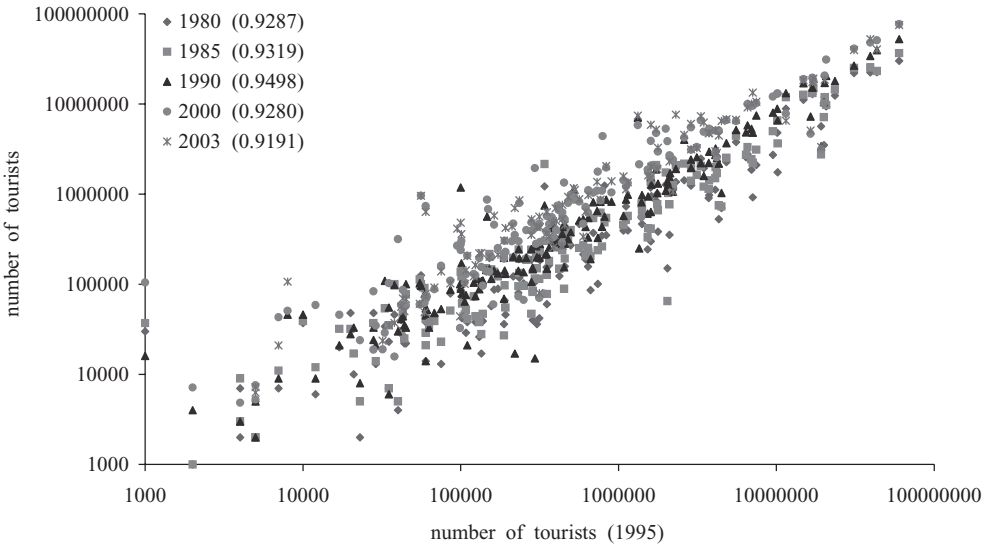

Figure A1. Number of international arrivals per country in 1980, 1985, 1990, 2000, and 2003 versus the number of international arrivals in 1995. The number in brackets the fraction explained variance in a linear regression of the alternative on the base year.

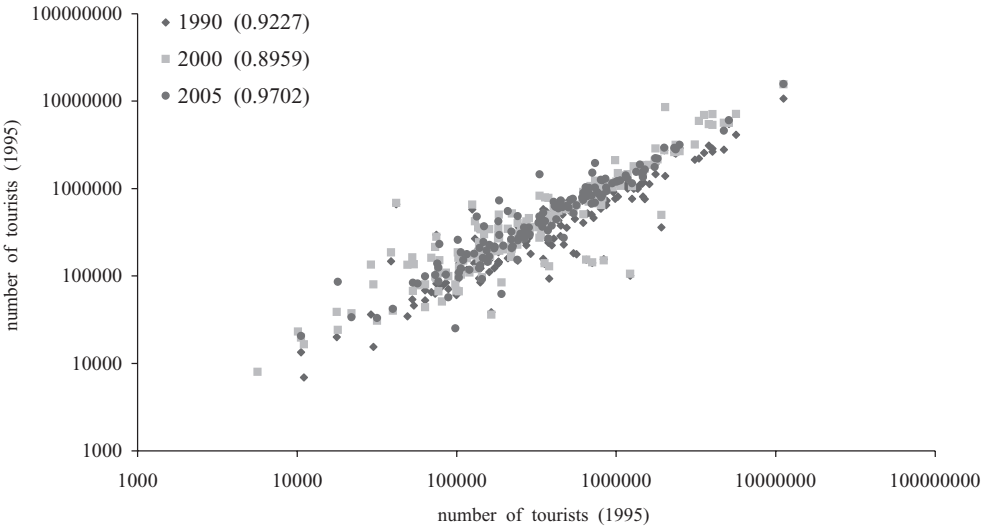

Figure A2. Number of foreign tourists per NUTS2 area in 1990, 2000, and 2005 versus the number of foreign tourists in 1995. The number in brackets the fraction explained variance in a linear regression of the alternative on the base year. Data are for the European Union only.

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